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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/715,935	11/17/2000	Xiangxin Bi	2950.16US02	9146

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EXAMINER	
STOUFFER, KELLY M	
ART UNIT	PAPER NUMBER
1762	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/715,935	BI ET AL.	
	Examiner	Art Unit	
	Kelly Stouffer	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *18-38 and 62-73* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *71-73* is/are allowed.

6)☒ Claim(s) *18-24,26-28,33-38 and 62-70* is/are rejected.

7)☒ Claim(s) *25 and 29-32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/4/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed 14 February 2007, with respect to the 35 USC 112 second paragraph rejection of claims 33-38 and 62-66 have been fully considered but they are not persuasive. Claim 33 recites the limitation "a reactant stream with a cross section perpendicular to the propagation direction, the cross section being characterized by a major axis and a minor axis..." The relationship between the major and minor axes is uncertain other than the major axis is twice the size of the minor axis. It is not clear where the axes are in relation to one another, and in what direction the major or minor axis travels depending on one's frame of reference. It is required that the cross section is perpendicular to the propagation direction, but is it the propagation direction of a radiation beam, or something else entirely? This also renders the claim indefinite as it is not clear what direction the axes are perpendicular to. For examination purposes, the propagation direction is assumed to be along the direction of the radiation beam.

In view of the amendments, the 35 USC second paragraph rejection of claim 27 is withdrawn.

2. Applicant's arguments filed 14 February 2007 with respect to the 35 USC 102(b) rejections under Whiney et al. have been fully considered but they are not persuasive.

The applicant argues that Whitney teaches neither the specifics of the flow limitations in the claims or that the laser is directed to a beam dump. However, Whitney teaches the claim limitations as they are written in the examples of Whitney, as was cited in the previous office action, and this is shown in Figures 1 and 2 of Whitney, with beam axis 106 traversing through the focal point of the coating material. These pictures, along with the supporting example, describe a flow traveling through a laser beam according to the current claim language. Traveling with the beam is broadly interpreted to include traveling through the beam, as the material is in the beam. This is described in more detail, for example, in Whitney column 4 lines 35-61. Particles are produced by reaction as described in Whitney column 2 line 65-column 3 line 16. Further, as a beam dump is described in the specification, Whitney also meets this limitation by having the laser hit the substrate. Therefore, the rejections including Whitney are maintained and are repeated here.

3. Applicant's arguments with respect to the 35 USC 103(a) rejections including Akedo have been considered but are moot in view of the new ground(s) of rejection necessitated by amendment.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 33-38, and 62-66 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 33 recites the limitation "a reactant stream with a cross section perpendicular to the propagation direction, the cross section being characterized by a major axis and a minor axis..." The relationship between the major and minor axes is uncertain other than the major axis is twice the size of the minor axis. It is not clear where the axes are in relation to one another, and in what direction the major or minor axis travels depending on one's frame of reference. . It is required that the cross section is perpendicular to the propagation direction, but is it the propagation direction of a radiation beam or something else entirely? This also renders the claim indefinite as it is not clear what direction the axes are perpendicular to. For examination purposes, the propagation direction is assumed to be along the direction of the radiation beam.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 18-20, 22-24, 26-28, 33-37, 62, and 64 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent number 5043548 to Whitney et al.

Regarding claim 18, Whitney et al. discloses a method of coating a substrate comprising reacting a reactant stream within a flow (Examples) by directing a radiation beam at the reactant stream to produce within the flow a product stream comprising particles downstream from the radiation beam, or at least the effective area of the radiation beam, wherein the particles are produced by a reaction driven by the radiation beam and the flow passes through the radiation beam and is directed towards a substrate, which is also a beam dump as broadly defined in the instant specification (columns 2 and 3 lines 65-16). Whitney et al. also discloses moving the substrate relative to the flow of the product stream (Examples) with a coating comprising fused or melted particles (columns 2 and 3 lines 65-16).

With regard to claims 19 and 20, the radiation source used by Whitney et al. is a laser (abstract).

With regard to claim 22, Whitney et al. shows the reactant stream elongated in a direction along the propagation of the reactant beam in Figure 2

Regarding claims 23, 24 and 26 the substrate may move relative to the product stream (Fig. 2 and Examples) to deposit product particles on the substrate from a reactant stream elongated in a direction along the propagation of the reactant beam or laser.

Regarding claim 27, Whitney et al. also discloses that the reactant inlet or nozzle may move relative to the substrate to sweep particles across the substrate in column 7 lines 41-43.

Regarding claim 28, the conduit or nozzle is shown in Fig. 2 and the reactant inlet or nozzle may move relative to the substrate to sweep particles across the substrate in column 7 lines 41-43.

Regarding claim 33, Whitney et al. discloses a method of coating a substrate comprising reacting a reactant stream within a flow (Examples) by directing a radiation beam at the reactant stream. The reactant stream entering the apparatus from feed lines 136 is moved with the use of carrier gas into a flow and at some point in Figure 2 is perpendicular to the direction of the laser beam 106. There can be 2 feed tubes 136, which given that the reactant stream is enclosed within carrier gas would indicate that from these two feed tubes that the major axes would be larger than the minor axes at least how it is described in the instant specification, and depending on where one drew a frame of reference, the major axis is two times the minor axis (also see column 5 lines 22-33). Within a flow a product stream comprising particles downstream from the radiation beam is produced, or at least the effective area of the radiation beam, wherein the particles are produced by a reaction driven by the radiation beam and the flow passes through the radiation beam and is directed towards a substrate (columns 2 and 3 lines 65-16). Whitney et al. also discloses moving the substrate relative to the flow of the product stream (Examples) with a coating comprising fused or melted particles (columns 2 and 3 lines 65-16).

Regarding claim 34, the examples give deposition rates greater than 25 grams per hour in the examples.

Regarding claim 35, the reaction is driven by a laser beam which is also a light beam (abstract).

Regarding claim 36 the major axis is ten times the minor axis depending on one's frame of reference in Figure 2.

Regarding claim 37, the flow of particles is maintained by the momentum of the product stream (column 6 lines 51-60).

With regard to claim 62, the radiation source used by Whitney et al. is a laser (abstract).

With regard to claim 64, Whitney et al. shows the reactant stream elongated in a direction along the propagation of the reactant beam in Figure 2

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 21, 38, 63 and 65-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Whitney et al. in view of US Patent number 5874134 to Rao et al.

Whitney et al. includes the provisions of claims 65-68 and 70 as discussed above. In addition Whitney et al. shows only depositing a layer on a portion of a substrate in Figure 2 and describes the desirability of only coating portions of the substrate in column 1 et seq. Whiney et al. does not include a substrate that may be temperature controlled with means of heating and cooling the substrate. Rao et al. teaches that the substrate may be temperature controlled by means to heat and cool the substrate in order to prevent grain growth in the deposited layer and to make the deposited layer more dense (column 4 lines 34-67 and column 7 lines 2-10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Whitney et al. to include a substrate that may be temperature controlled with means of heating and cooling the substrate as taught by Rao et al. in order to prevent grain growth in the deposited layer and to make the deposited layer more dense.

Regarding claims 21, 38, 63 and 69, Whitney et al. includes the provisions of these claims except for pumping on the reaction chamber to maintain flow or the stream of particles. Rao et al. describes pumping a on the vacuum chamber, which one of ordinary skill in the art would have recognized as maintaining flow or a stream of particles within the chamber, to remove byproducts from the chamber (column 6 lines 50-61).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Whitney et al. to include pumping on the reaction chamber to maintain flow or a stream of particles as taught by Rao et al. in order to remove byproducts from the reaction chamber.

Allowable Subject Matter

7. Claims 25 and 29-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Whitney et al. or Rao et al.

alone or in combination do not provide for coating more than one substrate, or creating a glass coating by heating the substrate.

8. Claims 71-73 are allowed. The prior art used in this Office Action, alone or in combination, does not support coating more than one layer by the disclosed methods in the manner claimed in claim 71.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kelly Stouffer whose telephone number is (571) 272-2668. The examiner can normally be reached on Monday - Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kelly Stouffer
Examiner
Art Unit 1762

kms

TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER